Lebanese University (UL)
Faculty of Sciences (V)

I3306
Lab n° 6

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Consider the following database schema :

- Instructor(<u>*InstNo*</u>, Name, Rank)
- Student(<u>*StudentNo*</u>, Name, Address, EnrollD, GraduatD)
- Course(<u>*CourseNo*</u>, Title, nbHours, InstNo)
  InstNo references Instructor(InstNo)
- Take(<u>*StudentNo*</u>, <u>*CourseNo*</u>, Grade)
  StudentNo references Student(StudentNo)
  CourseNo references Course(CourseNo)

Exercise 1

Write the following transactions. What is the output ? Comment !

(a)

```
begin transaction
insert into Instructor values ('1111','Lionel', 'Full', 30)
select * from Instructor
rollback
select * from Instructor
```

(b)

```
begin transaction
insert into Instructor values ('1111','Lionel', 'Full', 30)
select * from Instructor
commit
select * from Instructor
```

(c)

```
begin transaction
insert into Instructor values (null,'Lionel', 'Full', 30)
select * from Instructor
commit
select * from Instructor
```

Exercise 2

Write a transaction that does the following actions :

(a) Insert a new instructor

(b) Associate all courses taught by instructor number 12345 to the inserted instructor

(c) Delete the instructor number 12345.

Exercise 3

(a) Make a copy named "Temp" (structure + data) of the Student table

(b) Display the content of the Temp table

(c) Write a transaction that deletes all rows from the table "Temp"

(d) Check if the table "Temp" is empty

(e) Cancel the last operation DELETE

(f) Check that all rows before the transaction exist

Exercise 4
Write the following constraints using triggers.

(a) The age of students must be greater than 18

(b) The instructor must be older than all his students

(c) An instructor teaches at most 4 courses

Exercise 5
Write the following triggers :

(a) A trigger that prohibits the modification of grades

(b) A trigger that prevents any operation on the table instructor

(c) A trigger that after removing an instructor, remove all its related information

(d) Write a trigger that rolls back when trying to add an instructor that is already inserted.

(e) A trigger that prohibits to decrease the number of course hours.

Exercise 6
Create a table that has two columns : id and name. Make the id auto-increment using triggers. The initial seed should be 10.

Exercise 7
One wants to very quickly retrieve some statistics for each student and for this one needs a 'master table' : StatStudent (id, nbS, nbF, av). This table maintains the number of successful courses (nbS), the number of failed courses nbF and the grade average (av) of each student. Write a trigger that maintains the table StatStudent updated correctly whenever the table "Takes" is updated. Make sure you can handle every possible update of "Takes" that influences StatStudent.

Exercise 8
Create an audit trail that stores changes in the table "Take".